☐ 1: J Muscle Res Cell Motil. 2000 May;21(4):375-82. Related Articles, L

Functional diversity between orthologous myosins with minimal sequence diversity.

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To define the structural differences that are responsible for the functional diversity between orthologous sarcomeric myosins, we compared the rat and human beta/slow myosins. Functional comparison showed that rat beta/slow myosin has higher ATPase activity and moves actin filaments at higher speec in in vitro motility assay than human beta/slow myosin. Sequence analysis shows that the loop regions at the junctions of the 25 and 50 kDa domains (lc 1) and the 50 and 20 kDa domains (loop 2), which have been implicated in determining functional diversity of myosin heavy chains, are essentially identical in the two orthologs. There are only 14 non-conservative substitutio in the two myosin heavy chains, three of which are located in the secondary actin-binding loop and flanking regions and others correspond to residues so not assigned a functional role, including two residues in the proximal S2 domain. Interestingly, in some of these positions the rat beta/slow myosin heavy chain has the same residues found in human cardiac alpha myosin, a fa type myosin, and fast skeletal myosins. These observations indicate that functional and structural analysis of myosin orthologs with limited sequence diversity can provide useful clues to identify amino acid residues involved in modulating myosin function.

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